Application Number 10/540770
Response to the Office Action dated 03/20/2008

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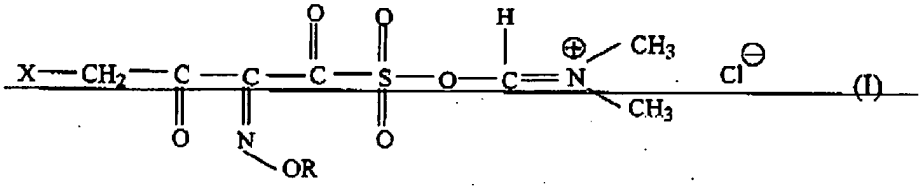
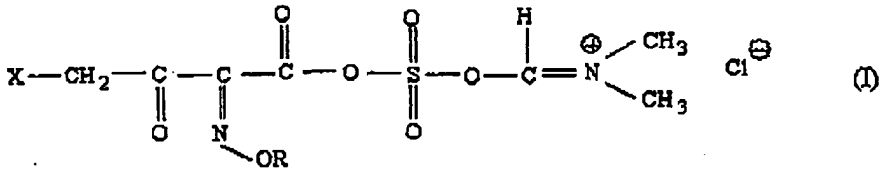
Amendments to the Specification:

The listing of the specification will replace all prior versions of the corresponding paragraphs of the specification in the application.

Please replace the paragraph appearing on lines 4-13 of page 1 of the specification with the following amended paragraph:

The present invention relates to novel compounds of formula (I),



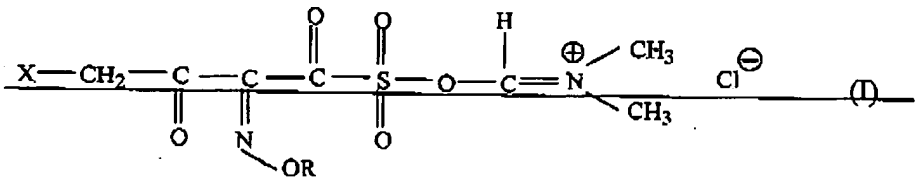


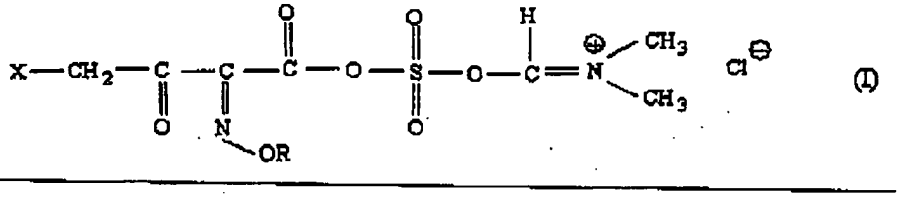
wherein X is chlorine or bromine; R is hydrogen, , C_{1-4} alkyl group, an easily removable hydroxyl protective group, $-CH_2COOR_5$, or $-C(CH_3)_2COOR_5$, wherein R_5 is hydrogen, or an easily hydrolysable ester group. The present invention also relates to a process for preparation of the compounds of formula (I). The invention also relates to the use of the novel compounds of formula (I) for preparation of cephalosporin antibiotics, in particular cephalosporin compounds of formula (II).

Please replace the paragraph appearing on line 27 of page 7 to line 4 of page 8 of the specification with the following amended paragraph:

Thus the present invention according to one aspect provides novel compounds of formula

(I)





wherein X is chlorine or bromine;

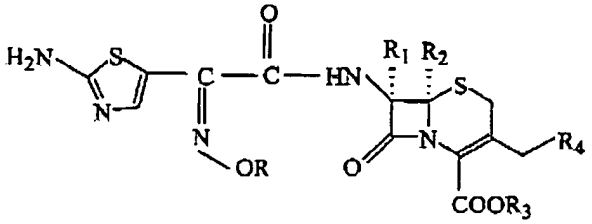
R is hydrogen, C_{1-4} alkyl group, an easily removable hydroxyl protective group,

$-CH_2COOR_5$, or $-C(CH_3)_2COOR_5$, wherein

R_5 is hydrogen, or an easily hydrolysable ester group.

Please replace the paragraph appearing from line 17 of page 8 to line 10 of page 9 of the specification with the following amended paragraph:

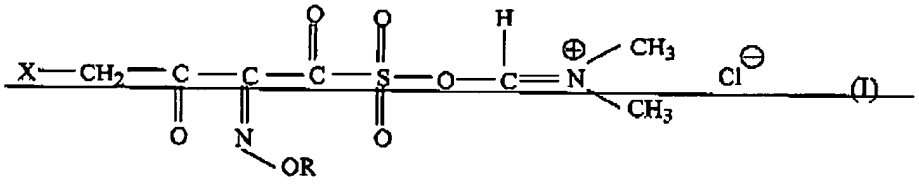
According to a further aspect of the present invention there is provided a process for preparation of cephalosporin compounds of formula (II)



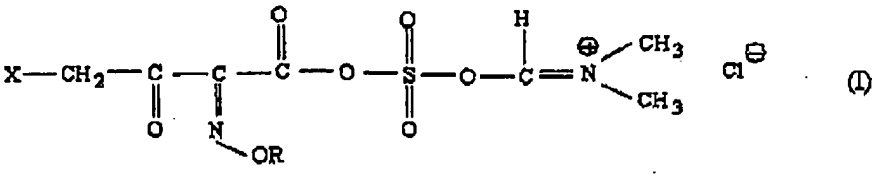
(II)

wherein R and R_5 are as defined above; R_1 is hydrogen or $-OCH_3$; R_2 is hydrogen; R_3 is hydrogen, a negative charge or together with the COO^- group to which R_3 is attached is an ester or an alkali or alkaline earth metal; R_4 is hydrogen or is a substituent useful in cephalosporin chemistry,

the process comprising reaction of compound of formula (I)



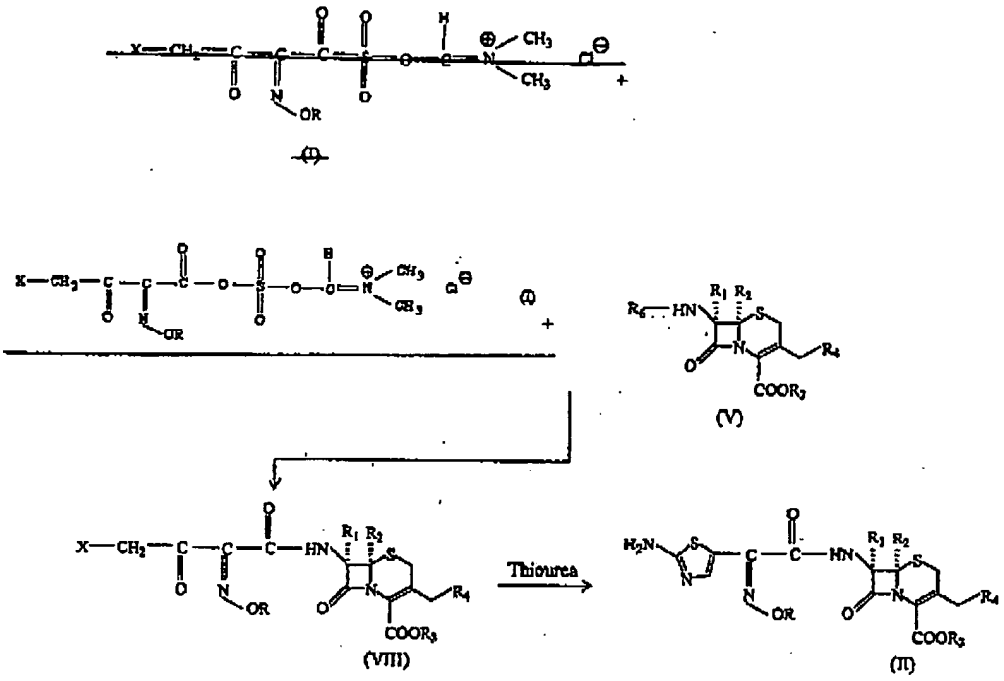
(I)



(I)

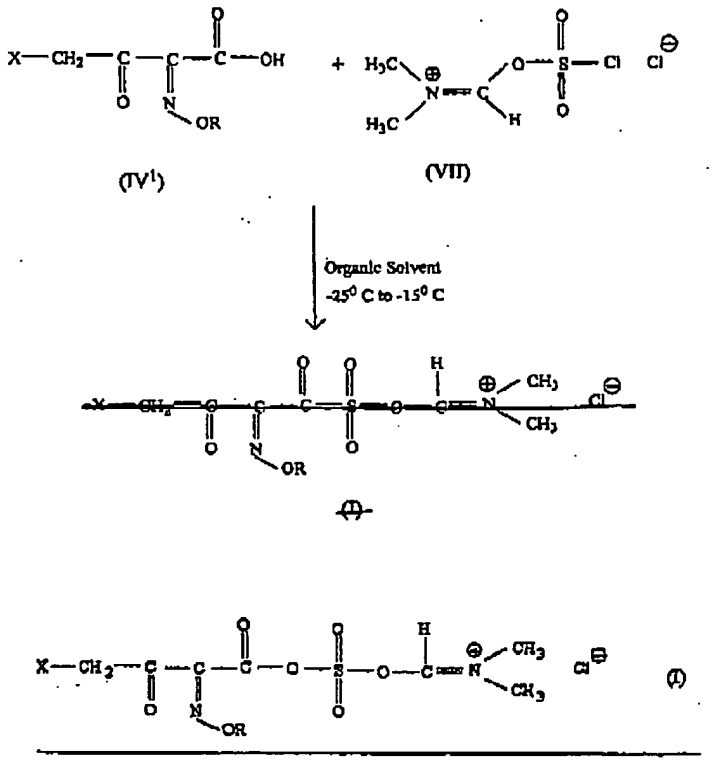
wherein X and R are as defined hereinbefore with 7-amino cephalosporanic acid of formula (V),

Please replace Scheme-II, appearing on page 11 of the specification, with the following amended Scheme-II:



REACTION **SCHEME-II : Method of Synthesis of Compounds (II) as per the Present Invention**

Please replace Scheme-IV, appearing on page 14 of the specification, with the following amended Scheme-IV:



SCHEME-IV : Method of preparation of Compounds of formula (I)

Please replace the paragraph appearing from lines 4-15 of page 15 of the specification with the following amended paragraph:

The PMR spectrum of the novel 4-bromo-2-methoxyimino-3-oxo butyric acid N, N dimethyl formiminium chloride chlorosulfite adduct of formula (I^1) was recorded neat with DMSo-d_6 as external lock at room temperature using CH_2Cl_2 as reference. The spectra shows two broad 1H signals at 13.4 ppm and 8.2 ppm respectively. Singlets due to $-BrCH_2$ and $-OCH_3$ are observed at 4.3 and 4.1 ppm respectively. The $-N(CH_3)_2$ signals appears at 3.2 and 3.1 ppm respectively.

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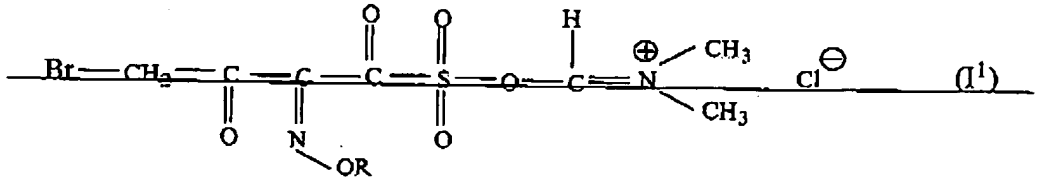
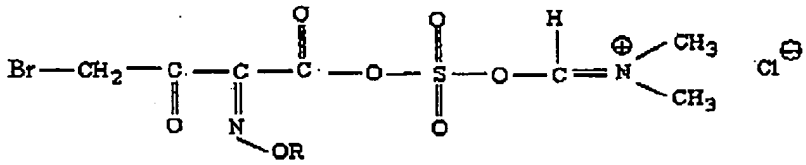


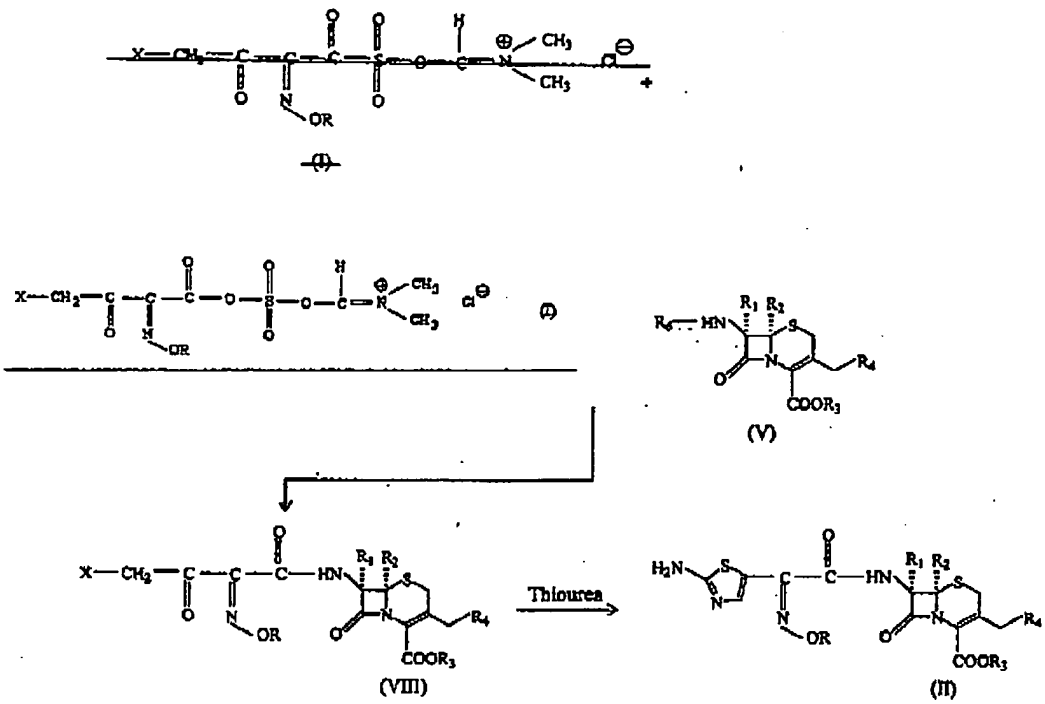
(I[1])



(I[1])

The IR spectrum of the freshly prepared bromo compound (I[1]) shows signals at 1784 cm^{-1} indicating anhydride functionality. After prolonged period of time, the signal disappears and a broad signal at 3379 cm^{-1} appears, implying that the anhydride is unstable and gets hydrolysed to the acid.

Please replace Scheme II, appearing on page 16 of the specification, with the following amended Scheme II:



SCHEME-II : Method of Synthesis of Compounds (II) as per the Present Invention